

Title: Material Usage in High Pressure Oxygen Systems for the International Space Station

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The Nitrogen/Oxygen Recharge System (NORS) for the International Space Station (ISS) Program was required as part of the Space Shuttle retirement efforts to sustain the ISS life support systems. The system is designed around a 7000 psia Oxygen or Nitrogen Recharge Tank Assembly which is able to be utilized both internally and externally to the ISS. Material selection and usage were critical to ensure oxygen compatibility for the design, while taking into consideration toxicity, weldability, brazability and general fabrication and assembly techniques. The system uses unique hardware items such as a composite overwrap pressure vessel (COPV), high pressure mechanical gauges, compact regulators and valves, quick disconnects, metal tubing and flexhoses. Numerous challenges and anomalies were encountered due to the exotic nature of this project which will be discussed in detail. The knowledge gained from these anomalies and failure resolutions can be applied to more than space applications, but can also be applicable to industry pressurized systems.